JMYT-362US

Appln. No.: 10/567,795

Amendment Dated August 29, 2008 Reply to Office Action of July 1, 2008

<u>Amendments to the Claims:</u> This listing of claims will replace all prior versions, and listings, of claims in the application.

## **Listing of Claims:**

## 1. - 33. (Canceled)

- 34. (Previously Presented) An exhaust system for a lean-burn internal combustion engine comprising a catalyst structure, which catalyst structure comprises a substrate monolith comprising a lean  $NO_x$  catalyst (LNC) composition associated with at least one partial oxidation catalyst (POC) and means for introducing a reductant into an exhaust gas upstream of the LNC composition, wherein the LNC composition is selected from the group consisting of: (a) silver or a silver compound supported on alumina; and (b) at least one metal selected from the group consisting of copper (Cu), iron (Fe), cobalt (Co) and cerium (Ce) supported on at least one zeolite, and wherein the at least one POC is a bulk oxide, a bulk composite oxide or a bulk mixed oxide comprising at least one metal selected from the group consisting of manganese (Mn), iron (Fe), cerium (Ce) and praseodymium (Pr).
- 35. (Currently Amended) A catalyst structure An exhaust system according to claim 34, wherein the substrate monolith comprises a physical mixture of the LNC composition and the at least one POC, a layer of the at least one POC on a layer of the LNC composition or a layer of the LNC composition on a layer of the at least one POC.
- 36. (Currently Amended) A catalyst structure An exhaust system according to claim 34, wherein the silver in the LNC composition of group (a) or the total amount of the at least one metal selected from the group consisting of Cu, Fe, Co, and Ce in the LNC composition of group (b) is present in the range 0.5 to 10.0 wt% based on the total weight of the alumina or zeolite support.
- 37. (Previously Presented) An exhaust system according to claim 34, wherein the at least one POC comprises at least one stabiliser selected from the group consisting of: zirconium (Zr), lanthanum (La), alumina (Al), yttrium (Y), Pr and neodymium (Nd).
- 38. (Currently Amended) An exhaust system according to claim 37, wherein the at least one stabiliser is present in the molar ratio 2.98M 2:98M to 90:10M, where M is the at least one metal selected from the group consisting of Mn, Fe, Ce and Pr.

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- 39. (Previously Presented) An exhaust system according to claim 34, wherein the at least one POC consists of bulk  $CeO_2$  or a mixed oxide or composite oxide of Ce and Zr.
- 40. (Currently Amended) A catalyst structure An exhaust system according to claim 34, wherein the weight ratio of the LNC composition to the at least one POC is from 20:1 to 1:5.
- 41. (Currently Amended) A catalyst structure An exhaust system according to claim 34, wherein the weight ratio of the LNC composition to the at least one POC is from 10:1 to 1:1.
- 42. (Previously Presented) An exhaust system according to claim 34, wherein some or all of the LNC composition on the substrate monolith is located downstream of the at least one POC.
- 43. (Previously Presented) An exhaust system according to claim 34, wherein some or all of the LNC composition on the substrate monolith is located downstream of the at least one POC on a separate substrate monolith.
- 44. (Previously Presented) An exhaust system according to claim 34, wherein some of the LNC composition is located on a separate substrate monolith disposed upstream of the substrate monolith comprising the at least one POC.
- 45. (Previously Presented) An exhaust system according to claim 34, wherein some of the LNC composition is located on a separate substrate monolith disposed upstream of the substrate monolith comprising the at least one POC on a separate substrate monolith.
- 46. (Previously Presented) An exhaust system according to claim 34, comprising means for introducing a reductant into an exhaust gas upstream of the LNC composition.
- 47. (Previously Presented) An exhaust system according to claim 42, comprising means for introducing a reductant into an exhaust gas upstream of the at least one POC.
- 48. (Previously Presented) An exhaust system according to claim 43, comprising means for introducing a reductant into an exhaust gas upstream of the at least one POC.
- 49. (Previously Presented) An exhaust system according to claim 34, wherein the or each reductant introducing means comprises at least one of: means for injecting the reductant into exhaust gas in the exhaust system; means for adjusting the ignition timing of at least one engine cylinder; and means for adjusting the engine air-to-fuel ratio.

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- 50. (Previously Presented) An apparatus comprising a lean-burn internal combustion engine including an exhaust system according to claim 34.
- 51. (Previously Presented) An apparatus according to claim 50, comprising a source of hydrocarbon reductant.
- 52. (Previously Presented) An apparatus according to claim 50, comprising means for controlling the or each reductant introducing means.
- 53. (Previously Presented) An apparatus according to claim 52, wherein the control means is arranged, when in use, to introduce the reductant into the exhaust gas when to POC is from between 200-350°C in temperature.
- 54. (Previously Presented) An apparatus according to claim 52, wherein the control means is arranged, when in use, to introduce the reductant into the exhaust gas when the LNC composition is above 200°C in temperature.
- 55. (Previously Presented) An apparatus according to claim 52, wherein the control means is arranged, when in use, to introduce the reductant between the POC and the LNC composition at a temperature of above 350°C.
- 56. (Previously Presented) An apparatus according to claim 50, wherein the engine is a diesel engine, optionally a heavy-duty diesel engine.
- 57. (Previously Presented) A method of selectively reducing  $NO_x$  in an exhaust gas of a lean burn internal combustion engine to  $N_2$ , which method comprises introducing a reductant into the exhaust gas and contacting the resulting mixture with a lean  $NO_x$  catalyst (LNC) composition associated with at least one partial oxidation catalyst (POC), wherein the LNC composition is selected from the group consisting of: (a) silver or a silver compound supported on alumina; and (b) at least one metal selected from the group consisting of copper (Cu), iron (Fe), cobalt (Co) and cerium (Ce) supported on at least one zeolite, and wherein the at least one POC is a bulk oxide, a bulk composite oxide or a bulk mixed oxide comprising at least one metal selected from the group consisting of manganese (Mn), iron (Fe), cerium (Ce) and praseodymium (Pr).